

A NEW SPECIES OF *ISOPHYA* BRUNNER VON WATTENWYL (ORTHOPTERA: TETTIGONIIDAE: PHANEROPTERINAE) FROM TURKEY¹

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ABSTRACT: A new species of *Isophya* Brunner von Wattenwyl, *I. karadenizensis* sp.n. is described from eastern part of the Karadeniz Region of Turkey. A key to *pyrenaea* species group of the genus is provided. Illustrations, distributional map and a check list of the known *Isophya* species from the Region are added.

KEY WORDS: taxonomy, Orthoptera, Phaneropterinae, *Isophya*, Turkey, Karadeniz region, new species, check list

Kenneth M. Guichard, who was an excellent collector of insects (1914-2002) and hymenopterist David H. Harvey, made three major collecting expeditions to Turkey for the Natural History Museum London (BMNH). The first was made by Guichard in 1959 and the last two were made both researchers in 1960 and 1962. In these expeditions, materials in Hymenoptera, Orthoptera, Diptera, Lepidoptera (Rhopalocera), Hemiptera, Homoptera, Coleoptera, and Odonata were collected from various parts of Turkey (Guichard and Harvey, 1967; pers. commun. Judith Marshall). Most of the specimens of Orthoptera collected by Guichard and Harvey were evaluated by the famous Turkish Orthopterist Tevfik Karabağ (1911-2003). He described five species in the genera *Poecilimon* Fisher, *Pholidoptera* Wesmäl and *Parapholidoptera* Maran among that material (Karabağ, 1961, 1964, 1975). After him, two *Glyphotmethis* Bey-Bienko (Cejchan, 1964; 1965) and two *Parapholidoptera* Maran (Stolyarov, 1984; Ciplak, 2000) were described from that material deposited in the Natural History Museum London.

During a recent study in the Natural History Museum London, the author recognized some specimens collected by Guichard and Harvey, as belonging to an undescribed species of the genus *Isophya* Brunner von Wattenwyl. The specimens were collected at high elevations in the Soğanlı Mountain, eastern part of Karadeniz, one of the geographical regions of Turkey (Fig. 9).

Isophya is a widespread genus in Turkey and it is also from southern and south-eastern Europe, Caucasia, Middle East, Middle Asia (Ünal, 2004) and it prefers mostly cool, humid climates and mesic vegetation. *Isophya* can be frequently found from low elevations (to 1000 m) in the second half of spring and early summer (April, May and June) and, at some high elevations (1500-2000 m), in late summer (July and August) of the geographical regions of the Aegean, Mediterranean, Middle Anatolia, a part of east Anatolia and southeast Anatolia which

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have mostly xeric vegetation and high temperatures. A part of the Marmara and especially the Black Sea (Karadeniz) regions have cool and humid climate and mesic vegetation throughout the summer and the beginning of autumn (September). Therefore, it is possible to find many species of *Isophya* during this period in the Karadeniz region (Table 1) (Miram, 1938; Ramme, 1951; Bey-Bienko, 1954; Karabağ, 1958, 1962; Maran, 1958; Ünal, 2003b, 2004; Sevgili, 2004).

This paper contains the description of *Isophya karadenizensis*, a new species from the Karadeniz Region of Turkey, with illustrations (Figs. 1-8) and a distribution map (Fig. 9). A check list of the species of *Isophya* known from the Karadeniz Region (Table 1) and a tabular key to related congeners are included (Table 2).

Table 1. Check list of the *Isophya* Brunner von Wattenwyl species known from the Karadeniz Region of Turkey.

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|---|---|
| 1. <i>I. acuminata</i> Brunner, 1878 | 10. <i>I. pavelii</i> Brunner, 1878 |
| 2. <i>I. amplipennis</i> Brunner, 1878 | 11. <i>I. rectipennis</i> Brunner, 1878 |
| 3. <i>I. autumnalis</i> Karabağ, 1962 | 12. <i>I. redtenbacheri</i> Adelung, 1907 |
| 4. <i>I. bicarinata</i> Karabağ, 1957
(unpubl. data) | 13. <i>I. reticulata</i> Ramme, 1951 |
| 5. <i>I. ilkazi</i> Ramme, 1951 | 14. <i>I. rizeensis</i> Sevgili, 2004 |
| 6. <i>I. karadenizensis</i> sp. n.
(this paper) | 15. <i>I. schneideri</i> Brunner, 1878 |
| 7. <i>I. nervosa</i> Ramme, 1951 | 16. <i>I. staneki</i> Maran, 1958 |
| 8. <i>I. obenbergeri</i> Maran, 1958 | 17. <i>I. stenocauda</i> Ramme, 1951 |
| 9. <i>I. obtusidens</i> Ramme, 1951 | 18. <i>I. sureyai</i> Ramme, 1951 |
| | 19. <i>I. yaraligozi</i> Ünal, 2003 |
| | 20. <i>I. zernovi</i> Miram, 1938 |

Isophya karadenizensis, NEW SPECIES

Figures 1-8

Type Locality: Turkey, Bayburt Province, Soğanly Geçidi, 2000-2500 m, 25 July 1960. Holotype deposited in the Natural History Museum London (BMNH).
Description. Male (holotype): Small size as for the genus. Fastigium of vertex distinctly narrower than half of antennal scape, with a distinct dorsal fossa; ratio of width of fastigium to width of scapus: 1/3, in paratypes 1/4-1/3. Antennal pedicel always broader than fastigium of vertex. Pronotum strongly narrowed anteriorly and widened in posteriorly; prozona constricted with distinct lateral carinae, narrower than head; anterior margin slightly concave, in some males straight; metazona sharply widened and raised, 1.48 times broader than prozona; covers anterior part of tegmina and base of CuP; lateral carina projected like a shoulder; transverse sulcus behind middle of pronotal disc. Tegmina short, as long as pronotum, reaching middle of 2nd abdominal tergite; anterior 1/4 part covered by pronotum; stridulatory file (CuP) long and thin, thinner than third

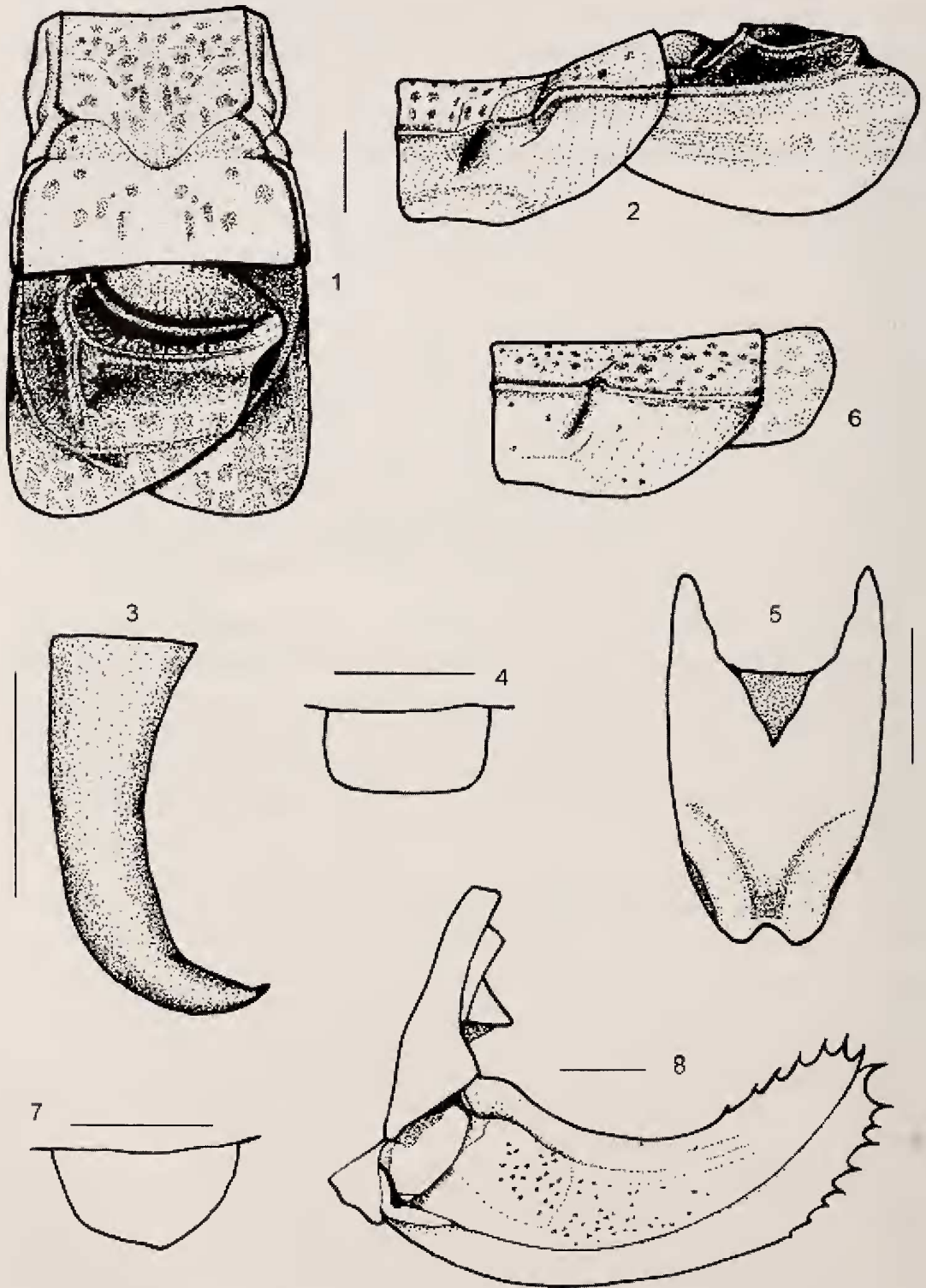
antennal joint, its length $3/4$ of hind margin of pronotum. Hind femur unarmed ventrally. Ratio length of fore tibia / pronotum 1.3. Supraanal plate about rectangular, both hind corners rounded, hind margin straight; 1.5 times longer than wide. Cercus moderately short; basal part somewhat wide, cylindrical and slightly incurved, apical part sharply narrowed and incurved; pointed with a large, curved apical tooth. Subgenital plate 1.8 times longer than wide; with shallow, round incision; its apical lobes with rounded apices; lower face without median carina.

Female: Fastigium of vertex as in male. Pronotum with distinct prozona and metazona; prozona narrow, with distinct lateral carina, anterior margin slightly concave; metazona widened and slightly raised, its lateral carina distinct, posterior margin straight. Tegmina short and wide, broader than hind margin of pronotum, hind margin slightly rounded; only a little surpassing anterior margin of first abdominal tergite; ratio length of tegmina to length of pronotum $1/3.8$. Hind femur unarmed ventrally. Supraanal plate wide at base, 1.3 times broader than long, rounded at apex. Cercus thin slightly curved inwards, longer than supraanal plate, its apex blunt. Subgenital plate broader than long. Ovipositor very short (6 mm); 1.6 times longer than pronotum; upper valve with 7, lower valve with 9 apical teeth; ratio ovipositor to hind femur $1/2$; gonangulum and basal fold of lower valve as in Fig. 8.

Color. Body green, with brown, reddish-brown, black spots and stripes. Dorsal surface of head, pronotum, some femora and all abdominal tergites with dark green, brown, reddish-brown and black spots; antennal scapus and pedicel with small reddish-brown spots, flagellum unicolor as yellowish-brown; head with black longitudinal stripe between eye and pronotum; lateral carina of pronotum light colored, with dark stripe contiguous to carina in metazona. Tegmina partly reddish-brown and green in male, from CuP to anal margin and from subcosta to radius vein of left tegmen reddish-brown, remaining part green; tegmina green in female. All legs yellowish-brown, with dark spots. Abdomen green, with dense dark green, brown or black spots; without any longitudinal band. Male cerci brown or reddish-brown, with black apical tooth. Subgenital plate greenish-yellow with reddish spots. Ovipositor yellowish green, with reddish-brown spots; apices of apical teeth reddish. All sternites greenish-yellow.

Measurements (mm). Length of body: male 17-18.3, female 17; pronotum: male 3.3-3.7, female 3.8; tegmen: male 3.3-3.7, female 1; hind femur: male 11.2-11.9, female 12.1; ovipositor: 6.

Type Material. Turkey, Bayburt Province (formerly the type locality and Bayburt were in Gümüşhane Province), Soğanly Geçidi, 2000-2500 m (7000-7500 ft in the label), 25 July 1960, 13 males (including holotype), 1 female (leg. K. M. Guichard and D. H. Harvey). Eleven males and female are deposited in the Natural History Museum London, two males are in the Entomological Museum of Abant Yzzet Baysal University, Bolu (collection of Mustafa Ünal).



Figures 1-8. *Isophya karadenizensis* n.sp. 1, male pronotum and tegmina; 2, ditto, lateral view; 3, male left cercus; 4, male supra-anal plate; 5, male subgenital plate; 6, female pronotum and tegmen, lateral view; 7, female subgenital plate; 8, ovipositor. Scales 1 mm.

Differential Diagnosis. This new species is recognizable by the structure of pronotum, clearly constricted prozona, widened metazona; the short male tegmina (as long as pronotum); the shape of male cercus; narrowed fastigium of vertex; shape of shortened ovipositor and gonangulum.

Isophya karadenizensis sp. n. is in the *I. pyrenaea* group along with *I. pyrenaea*, *I. zernovi*, *I. bivittata*, *I. schneideri*, *I. altaica* (Bey-Bienko, 1954). The new species is related to *Isophya bivittata* Uvarov known from Caucasia (Bey-Bienko, 1954; Stolyarov, 1997; Systax, 2003) by the narrow fastigium of vertex, structure of pronotum, short male tegmina. But differs from it by the thinner CuP, shape of female tegmina, male cercus and subgenital plate, ratio of the length of ovipositor to the length of pronotum, shorter hind femur, female tegmina and ovipositor, ratio of the length of fore tibia to the length of pronotum, shape of ovipositor and gonangulum. It is similar to *Isophya altaica* Bey-Bienko known from Altai Mountains in Kazakhstan (Bey-Bienko, 1954; Otte et al., 1997) by the structure of pronotum, ratio of the length of pronotum to the length of tegmina in male and coloration. Differs from it in the distinctly narrowed fastigium of vertex, the thinner CuP, the shape of female tegmina, narrowed male tegmina, shape of supraanal plate, ratio of the length of female cerci to the length of supraanal plate; ratio the length of ovipositor to the length of pronotum, shape of shorter ovipositor and in other measurements. It is also near to *Isophya pyrenaea* Serville known from middle Europe (Bey-Bienko, 1954; Harz, 1969; Otte et al., 1997) by the short tegmina (as long as pronotum), the length of female tegmina (1 mm), the shape of hind margin of pronotum. But differs from it by the narrower fastigium of vertex, structure of pronotum, male cerci, subgenital plate, shorter ovipositor and measurements. This new species is near to *I. amplipennis* group (Bey-Bienko, 1954) by the very narrow fastigium of vertex and shortened ovipositor. But the other characteristics, especially the structure of pronotum in both sexes are different from this group.

Etymology. Named after the "Karadeniz" Region, which includes the type locality of this new species (Fig. 9).

Habitat: Soğanlı Mountains (3376 m) are known as a part of the East Black Sea Mountains of Turkey. Soğanlı Geçidi (2330 m) is the high pass on the borders of Bayburt and Trabzon provinces. The north facing slopes just below the pass consist of lush alpine meadows. These hillsides before they merge lower down with dense conifer forest are in places dotted with thick patches of *Vaccinium myrtillus*, a little *Salix* and the white *Rhododendron caucasicum* (Ericaceae) while *Primula auriculata* and *P. kuznetzowii* (Primulaceae) grow beside small bogs and streamlets. The southern slopes lack the typical lush alpine meadows of the northern side and consist in the area of the pass of turf expanses grazed by livestock (Guichard and Harvey, 1967).

Table 2. Comparison of the species of the *pyrenaica* group of *Isophya* Brunner von Wattenwyl.

Species	Fastigium of vertex	Male Pronotum	Male Tegmina	Male cercus	Ovipositor
<i>pyrenaica</i>	slightly narrower than half of scapus	without lateral projecting shoulder, with constriction	same length as pronotum	subapical part thick, gradually incurved; with small apical tooth	8.5-10 mm; twice pronotal length
<i>bivittata</i>	distinctly narrower than half of scapus	with lateral projecting shoulder; with constriction	same length as pronotum	subapical and apical parts thick gradually incurved; with small apical tooth	8-9 mm; 1.7-2 times Postal length
<i>altaica</i>	as broad as half of scapus	with lateral projecting shoulder; with constriction	same length as pronotum	subapical and apical parts thin somewhat sharply incurved; with small apical tooth	8.5-10.2 mm; 2.1-2.3 times pronotal length
<i>zernovi</i>	as broad as half of scapus	without lateral projecting shoulder; without constriction	longer than pronotum somewhat sharply	subapical and apical parts thick pronotal length incurved; with short and wide apical tooth	7-8 mm; 1.5-1.6 times
<i>schneideri</i>	as broad as half of scapus	without lateral projecting shoulder; without constriction	longer than pronotum	subapical and apical parts thin somewhat gradually incurved; with long and distinct apical tooth	7.5-10 mm; 1.4-1.8 times pronotal length
<i>karadenizensis</i>	distinctly narrower than half of scapus	with very distinct lateral projecting shoulder; with constriction	same length as pronotum	subapical and apical parts thin sharply incurved; with long, distinct and curved apical tooth	6 mm; 1.6 times pronotal length

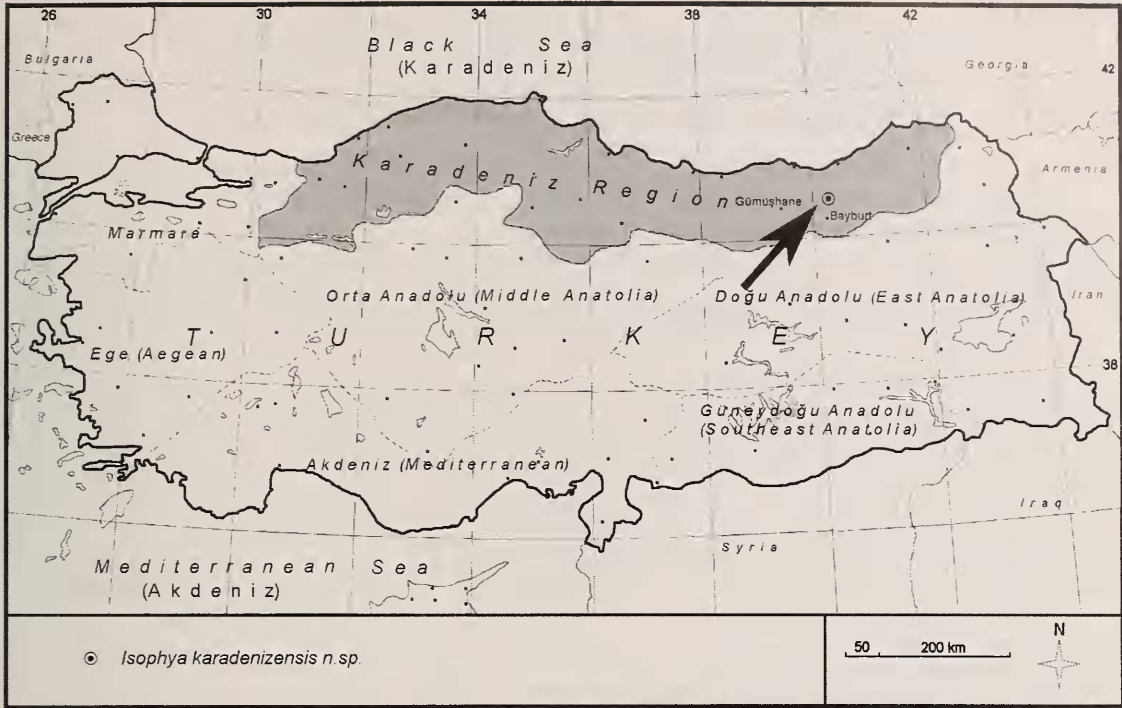


Figure 9. Only known locality of *I. karadenzensis* n.sp. Soğanly Geçidi, NE of Turkey and the geographical regions of Turkey.

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